PACS/GAPP North American Warm Season Precipitation Initiative

FY 2003 Information Sheet

$1 million available

The overall goal of the CLIVAR/PACS-GEWEX/GAPP North American Warm Season Precipitation Initiative is to determine the sources and limits of predictability of warm season precipitation over North America, with emphasis on time scales ranging up to seasonal-to-interannual. The initiative's principal objectives include (1) a better understanding of the key components of the North American monsoon system and its temporal and spatial variability, (2) a better understanding of the role of this system in the global water cycle and regional climate variability, and (3) improved simulation and intraseasonal-to-interannual prediction of the monsoon and regional water resources GAPP's interests focus on the role of land surface processes in the predictability of warm season precipitation, including their role in the onset, maintenance and decay of the monsoon system, their influence on the low level jets, and orographic precipitation processes. . The PACS program interests focus on improving the empirical description and climate model simulations of the continental-scale monsoon and its interannual variability; establishing the role of surface boundary processes (especially the role of the ocean) and transient atmospheric disturbances in determining the regional monsoon variability and improving the representation of key processes in coupled climate models; demonstrating that observed connections between leading patterns of climate variability (e.g. ENSO, PDO) and the continental-scale precipitation patterns are captured in climate models; and defining the climate observing system for monitoring and predicting summertime North American climate.

In FY 2003, NOAA's North American Warm Season Precipitation Initiative will support analyses and modeling projects that contribute to the North American Monsoon Experiment (NAME). NAME focuses on variability and predictability of summer climate over North America across the range of continental, regional and local scales of the monsoon circulation. Work is envisioned to proceed in parallel at all three scales.

At the continental scale, the focus is on an improved description and understanding of the spatial and temporal linkages between warm season precipitation, low level moisture fluxes, circulation patterns, and the dominant boundary forcing parameters. Emphasis is placed on the relationship of the evolving warm season precipitation regime over North America to the seasonal evolution of oceanic and land surface boundary conditions; the relationship of interannual variations in the boundary conditions, the atmospheric circulation, and the continental hydrologic regime; the correlation between the anomaly-sustaining atmospheric circulation and the land and ocean surface boundary conditions that characterize precipitation and temperature anomalies during the summer; the large-scale circulation controls on moisture fluxes from the Gulf of Mexico and Gulf of California; the links between the strength of the summer monsoon in southwestern North America and summertime precipitation over the central United States; and the

relationship between statistical frequency and magnitude of extreme events (e.g. floods, droughts, hurricanes) and climate variability on intraseasonal-to-interannual time scales.

At the regional scale, the focus is on an improved description and understanding of intraseasonal aspects of the monsoon. Key features and relationships to be investigated at this scale include the role of the Great Plains Low Level Jet (GPLLJ) and the Gulf of California Low Level Jet (GCLLJ) on summer precipitation and hydrology; the mechanisms, including atmospheric dynamic, thermodynamic, and land and ocean surface influences, responsible for the GPLLJ and GCLLJ and their modulation on seasonal to interannual times scales; the interactions between tropical easterly waves and the LLJs and associated moisture surges; the relationship between the Madden-Julian Oscillation, tropical cyclone activity, and monsoon precipitation; the role of the intertropical convergence zone/cold tongue complex and the warm pool region to the southwest of Mexico; and the bimodal distribution in warm season precipitation over Mexico and Central America.

At the local scale, the focus is on aspects of the low-level circulation and precipitation patterns in the core monsoon region. Principal research areas include the relative roles of local variations in sea surface temperature and land-surface parameters in modulating precipitation; orographic effects on low level jets and precipitation; the dominant source of precipitable moisture for monsoon precipitation; and the relationship of sea breeze/land breeze and mountain/valley circulations along the Gulf of California and the diurnal cycle of moisture and convection.

To meet the initiative's objectives, research will include a mix of diagnostic studies, modeling, and empirical prediction studies. Enhanced observations and intensive field measurements in support of the North American Monsoon Experiment (NAME) will be invited under a separate NAME field campaign announcement.

The research priorities above derive from the North American Monsoon Experiment (NAME) Science and Implementation, the CLIVAR Science and Implementation Plan and the GAPP Science Plan. Interested investigators are encouraged to review the NAME plan available online at
http://www.cpc.ncep.noaa.gov/products/precip/monsoon/NAME.html.